

THE AMERICAN MINERALOGIST

VOL. I

DECEMBER, 1916

No. 6

A NEW OCCURRENCE OF CRYSTALLIZED WILLEMITE

R. W. CLARK

University of Michigan

WHILE willemite is not an uncommon mineral, its occurrence in distinct crystals has not been frequently noted in the literature and it seems advisable to record a new locality for this mineral. The specimens described below were collected by Mr. W. H. Parker in the Star District, Beaver County, Utah, and were sent to this laboratory for determination by Ward's Natural Science Establishment. Details as to the field occurrence are not at hand.

The specimens, seven in number, vary in size from 1 x 1 x 2 inches up to about the size of a fist. They are very drusy in character and the cavities are lined with small crystals of willemite and of several less abundant minerals. The associates are small colorless crystals of hemimorphite (calamine) with a tabular development parallel to the brachypinacoid, well defined rhombohedrons of milky calcite and rounded colorless crystals of calcite, small mushroom or pestle shaped aggregates of yellow mimetite, frosted crystals of quartz with the prism and unit rhombohedrons, and long columnar crystals of cerussite with a yellow to greenish coating.

The willemite crystals are small, being about one half of a millimeter in diameter and three quarters of a millimeter in length. Some of them are limpid but the majority have a red color. Examined under the microscope this color is seen to be due to a red pigment, probably iron oxide, unevenly disseminated in the crystals. Single or sharp images could not be obtained, especially on the prism faces, which are greatly striated vertically. For this reason it was not possible to determine the axial ratio,

but the forms present could be identified as c (0001), e (01 $\bar{1}2$), a (11 $\bar{2}0$), and m (10 $\bar{1}0$). See figure 1.

The development of the crystals is very similar to that recorded by Penfield on some willemite crystals from the Merritt Mine in Socorro County, New Mexico.¹ The unit prism of the first order was not observed by Penfield, but appears as a very narrow face on some of the crystals from Utah. The images were very dull, but by shimmer reflections its identity could be definitely

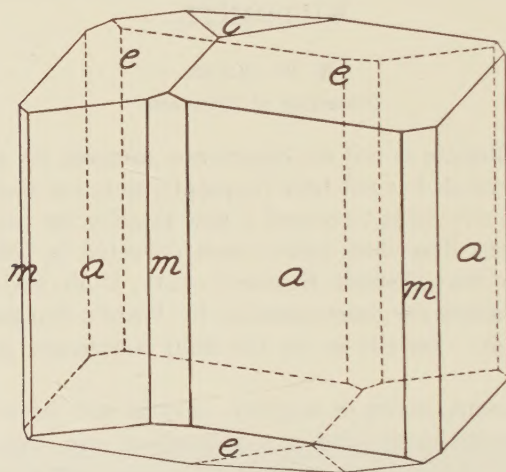


FIGURE 1. CRYSTAL OF WILLEMITE FROM BEAVER CO., UTAH

established. The following represent the average of the various observations made:

	<i>Observed</i>	<i>Calculated</i>
$a : a'$	59° 57'	60°
$a : m$	30° 40'	30°
$c : e$	20° 54'	21° 8'
$e : e'$	36° 17'	36° 23'

The indices of refraction were determined under the microscope by the immersion method. α -monochloronaphthalene and methylene iodide were mixed until a solution was obtained having the same index as the mineral for a given direction and then the index of the liquid for sodium light was determined on the Abbé total refractometer. This gave the following values:

	Utah	Franklin Furnace	
	Clark	Gaubert ²	Palache ³
ωNa	1.690 ± 2	1.6931	1.6939
ϵNa	1.716 ± 2	1.7118	1.7230
$\epsilon - \omega$	0.026	0.0187	0.0291

The value of the index for the extraordinary ray and the double refraction are somewhat higher than the corresponding values given by Gaubert for willemite from Franklin Furnace and are a little lower than those assigned to willemite from the same locality by Palache. These differences may be due to molecular replacements in the chemical composition of the mineral but, since analyses are not given for the specimens on which the indices have been determined, this idea cannot be verified at present.

It is interesting to note that the index for the ordinary ray does not change materially while the variations for the index of the extraordinary ray are considerable. Penfield and Minor⁴ have shown that in topaz the amounts of fluorine and hydroxyl vary widely and that with these variations come changes in the optical properties of the mineral and in the axial ratios. In willemite it seems probable that molecular replacements of the zinc by manganese or other elements cause a lengthening or shortening of the c axis and a corresponding change in the elasticity in that direction due to the separation or compression of the crystal molecules. Further work on this point is contemplated.

Manganese-free willemites from two other localities, Sedalia Mine, Colorado, and Altenberg, Germany, have identically the same indices of refraction as the Utah mineral described by Mr. Clark in the above article. These values, instead of those of Gaubert, which are usually quoted, should therefore be accepted for pure, normal willemite. [THE EDITORS.]

² Groth's *Chem. Kryst.*, II Teil, p. 253.

³ *Z. Kryst. Min.*, **47**, 582, 1909.

⁴ *Am. J. Sci.*, **47**, 387, 1894.

ABSENCE OF PYRITE FROM CERTAIN ZEOLITE LOCALITIES

J. VOLNEY LEWIS

Rutgers College, New Brunswick, N. Y.

HAS unmistakable pyrite been found at any of the zeolite localities about Paterson or Hopewell, New Jersey?

For several years past I have been devoting part of my time to the careful observation and study of the numerous mineral localities in the Triassic trap rocks. The well-known similarity of associations and modes of occurrence are of course strikingly obvious, altho there are enough exceptions to lend variety, as in the absence of some of the less common minerals from certain localities and their presence, or even abundance, at others. On the other hand some of the most common species are so constantly found that they are generally taken for granted and hence scarcely noticed. Calcite, quartz, and pyrite are good examples.

Two or three years ago, in connection with these studies of the zeolites (which are still unfinished) I tabulated the minerals of the various New Jersey localities and was greatly surprised to find that I had neither observed, nor found any published reference to, the occurrence of pyrite at the famous localities about Paterson. The record of New Jersey mineral localities that has been kept for many years by Mr. W. S. Valiant, Curator of the Rutgers College Geological Museum, also showed the same surprising absence. Since then a careful scrutiny of the Paterson material in the Rutgers museum and in several other extensive collections, together with repeated inquiries and visits to the quarries, have failed to supply the omission. At no other prominent zeolite locality in the state has this condition been found, with the probable exception of Hopewell, where I have not found pyrite, altho diligent search for it has not yet been made.

Chalcopyrite is universally present, even where pyrite fails. Apparently there was always enough copper at these exceptional localities during the period of mineralization to combine with the iron and sulfur in the double sulfide.

THE PHILADELPHIA MINERALOGICAL SOCIETY
EXCURSION TO FALLS OF FRENCH CREEK

HARRY W. TRUDELL

Philadelphia, Pa.

AN EXTENDED period of dry weather ended right before we were to take the long talked of trip to Falls of French Creek where the old iron mine, dating from pre-revolutionary times, was to be opened again. The news had reached us thru several channels that high hopes were entertained of the mine once more becoming a producer of iron and that a considerable sum had been subscribed to install the latest improved devices for handling the ore; this, it was believed, would enable the product to be obtained cheaply enough to compete with the Minnesota and Michigan ores, which are of course handicapped by the high freight rate.

Friday evening's sky showed sufficient clouds to cause us more or less alarm as to the possibilities of a wet first-night's camp at Pottstown. Endeavoring to forget the weather conditions I started out to meet Sam Gordon at Chestnut Hill but was fortunate in having him board the same car, all resplendent in a natty military garb, with a knapsack stuffed almost to the bursting point with lunch, blanket and other odds and ends necessary to his comfort upon such an occasion. Naturally my companion attracted considerable attention from the fellow passengers, who perhaps tried to place him in the list of military men they had heard of. At the Chestnut Hill terminus we found that a recent change in schedule would necessitate our waiting until 8 o'clock for the Pottstown car whereas we had counted on leaving at 7.30; we later found that we could get as far as Norristown on a 7.30 car which we decided to do as McKinstry was to meet us there, he having to come in from Haverford; and upon arriving at Norristown we found him, all expectant. Greetings over, we took a seat on the coping surrounding Court House Square and discussed recent occurrences. The Pottstown car soon arrived and away we were whirled into the dark coolness of the country, the tedium of the journey relieved by our being forced to hand out numerous nickels to a busy conductor. Pottstown was reached about 10 o'clock and our journey commenced amid the

curious stares of the inhabitants,—the military man being an unending source of interest to all peoples. We crossed the Schuylkill River along with the country people who were returning home after an evening's pleasure along the ubiquitous urban necessity, "the great white way." Reaching the far side we were immediately attracted by the heavily wooded shore and upon descending found the place an ideal camp site, the ground free of weeds and débris and the birch trees tall and dense. Sam and Hugh immediately spread their blankets and prepared to rest while I made a cheerful little fire as a proper setting for the camp and it naturally added considerably to the charm of the place. I soon lay down and as the firelight became less and less on the trees above, fell asleep to be occasionally awakened by a brilliant glow in the sky from some nearby blast furnace. From somewhere out in the dark waters came the deep bass voices of some immense frogs; judging from their voices their size must have been about that of an oil cask.

A little after 3 o'clock I had to admit that it was raining, so I sat up and found that my mates were about to desert me, thinking my poncho made me independent of the weather. I decided to join them to seek refuge under the bridge, but that construction offered not the slightest shelter. So Hugh led the way across the road to a wooden structure on the river's bank and forced open the door on the ground level; as the interior was absolutely dark, I started in with my trusty flash lamp, but stopped instantly, for at my feet yawned an open well with no guard about it. Avoiding the chasm we found a dry empty room which struck Hugh and me as ideal but the cracked mud on the floor from some past flood, with imprints of rats' feet, did not appeal at all to Sam. However we soon got him settled and slept very well even if he did not. About 5 o'clock he just could not keep still any longer and awakened us by endeavoring to sing a lay regarding a dream of having dwelt in marble halls. He wanted us to leave at once with him but as we were snug and comfortable we refused to get up and threatened him with the well and other terrors if he did not get out or keep quiet. He chose the former and we both were soon asleep to be awakened at 6 o'clock by the re-entrance of our tormentor with a reinforcement in the towering person of Robert Rosenbaum; he had a poncho draped across his façade, balanced by a bulging knapsack, and carrying under his arm a small cedar chest, which we

later ascertained contained food supplies and not woollens. He had come up on the owl train. Of course we now had to get up and the rain having ceased we went down to our first camp site where we breakfasted and had a good time generally. An old duck came along with a brood of some twenty-five ducklings of assorted sizes; as we fed them we were much amused by the larger ones stepping unconcernedly on the necks and heads of the less robust. On the opposite bank a spry old fellow was industriously repairing the bottom of a row boat leaning well over the side; according to our theories we would soon be treated to a spectacle as well as a demonstration of equilibrium; but for some occult reason the show never came off despite the utter disregard of Newton's laws by the ancient mariner.

Clearing up the camp we crossed the river to the Pennsylvania Railroad station and about 7.10 the 5.38 from "down home" pulled in bringing two recruits: Dr. Jones and C. J. Jarden, making our company a force of six strong (all generals). Dr. Jones reported frigid conditions in Philadelphia and must have expected snow up here but after a short time on the road his illusions were dispelled and he retired into a bosky dell and removed a woollen garment the need of which would not be apparent for possibly six months. After forcing this useful garment into his tin botany box along with bananas, string, field glasses, botanical specimens, lunch, etc., the march was resumed with vigor. Mr. Jarden added much interest to our oddly attired troop, as his particular taste led to leather puttees, blue suit, red bandana neck cloth and a pudding like, well filled bag, which rested like a small "bustle" on his back. Strapped to his hip was a sharp little hatchet, in its own holster, which when the need became great was pressed into service as a geological hammer. Of course before leaving we had to show the raw recruits where we had passed the night and impress upon them the terrors of the deep uncovered well. This attended to, we started toward our goal eight miles away. New birds and strange flowers very much reduced our speed to say nothing of stops for water, and to study the topographical map. So on up hill and down, through the beautiful country, so extremely green after the shower, we journeyed on, a source of much interest to the natives. Everybody was happy and enthusiastic, the Doctor taking delight in calling the commonest, meanest looking weeds by their scientific names which of course none of the others could remember very long.

At 10.30, to our left, we were surprised to see the old brick stack of the mines, up on a hill. It was difficult to realize that we had covered the eight miles and that three hours had passed. Light hearts truly shorten the long road. A great change had occurred in the place since our visit a year previous,—new buildings had been erected, machinery installed, tracks laid, the old dumps turned upside down (much to our satisfaction), but to our regret no actual work of mining had commenced and was not expected to before June 15.

After a brief survey of the dumps, Sam, Hugh, Bob and Jarden descended the shaft, armed with a thick, lighted candle. After an absence of about twenty minutes, there being no sign of their reappearance, I decided to rescue them and bidding goodbye to Dr. J. started the descent. Darker and darker grew the way, wetter and slimier the ladders until I had to use my flash to find each succeeding ladder. After descending about 200 feet I heard the voices of the fellows and the ring of their hammers; at 240 feet I had reached the base of the vertical shaft and here commenced a slope of some 47° for about 170 feet over a surface of the roughest, muddiest kind of rock fragments. I could soon see the gleam of their candle and I had quite a little fun at their expense, before I declared myself to them. The effect was decidedly weird down in the slimy cavern, the extent of which could barely be seen by the aid of our meager illumination. I joined the group at the far end, after wading thru pools of water and crawling over the heaps of rough *débris*. There was some azurite and chrysocolla gotten from the walls, which were so coated with mud that it was difficult to see anything of interest. After working on the contact for a short while, we started back to the other end and the shaft entrance. Save for the additional fatigue, the ascent was much pleasanter than the descent, as the light from above was more effective. The prospectors were a sorry sight, but Sam worst of all, his military glory having suffered a pathetic eclipse beneath a layer of smooth black mud. He pretended not to mind, however.

The dumps yielded three types of byssolite, the fine silky hair like variety, the inclusions in calcite and the compact kind somewhat resembling paper fiber, all of light greenish gray color. Of course there were quantities of attractive pyrite cubes, octahedrons, etc., chalcopyrite, calcite (colored green by byssolite and milky), platy magnetite, graphite, and small gypsum

crystals. There were also some stains which were thought to be erythrite and some black andradite crystals.

About noon we went down to the village to lay in a supply of bread, butter and canned goods. Our 1 o'clock lunch consisted of remnants of the home packed provisions, canned beans, and a pea soup made from a dried concoction presented by Mr. Jarden, and known as "*Erbswurst*." Appetites were good even though the tableware was of the most primitive type and all enjoyed the repast immensely, even Sam, who is proverbially hard to please, since his taste runs largely to such dainties as jelly roll, grape juice, chicken, and apple cake, which our outfit did not afford. After a rest, mineral hunting was indulged in, until five of us found Mr. Madden, the foreman, with whom we spent about three hours in conversation. His experience was varied, he having worked in Cornwall (England), Franklin Furnace, New Zealand, the copper districts of Michigan and other well known mineral localities of the world. But the subject of minerals did not confine us at all as we wandered through the fields of politics, travel, philosophy, and many other subjects. Most of the time was spent grouped about a shaded well in a cool glade and from here we were conducted to the office and store room, where we had the pleasure of examining instruments, drills, carbide lamps and other mining necessities and conveniences. After tiring of this subject we sought out our favorite spots on the dumps and added to our collections of specimens.

Supper time soon came, one of the articles of the menu being canned oysters, which were far from being the large fresh fellows to which we had been accustomed. McKinstry, in order to make the most of his opportunities and at the same time add something to the culinary art attempted an oyster stew with sweetened condensed milk! Our camp was on a small knoll surmounting the high hill on which the mine is located. The view of the surrounding country was particularly attractive whether it was morning, noon or night, and even under the bright starlight it had a wonderful charm. The patches of woodland, ploughed fields, farmsteads, orchards, and tracts of maturing wheat all made up a picture which appealed to everyone. Dr. Jones, not having a blanket nor a desire to subject himself to the terrors of a breezy hill top, decided to descend to Knauertown, down in the valley, near the Falls, and find lodging in the hotel. We all acted as guard of honor to the entrance of the place, and

as he did not reappear, we concluded he had retired to the comfort of a bed. We went to the store for further supplies and a talk with the proprietor, and, there being no attraction in the village, we ascended to our camp and built a large fire for comfort, as a very noticeable breeze had sprung up. About 9.30 it occurred to Sam that some of the members of the P. M. S. on their memorable visit of some years previous, had gone out on a trestle at night (See *Mineral Collector*, **13**, 177, 1907). Four of the party decided to make the trip, but Hugh felt that sleep would be preferable, and accordingly repaired to some planks prepared earlier in the day for the purpose and, wrapping himself up in brilliant red blankets, went to sleep. We reached the trestle without mishap. The thin crescent threw a little light into the tree shaded creek, from which arose the bass notes of several old frogs, and occasionally from the starlit sky came the lisping notes of a night hawk; these sounds, along with the splashing of the waters of the falls and the subdued sounds from the village made a charming effect, until a native spoiled it all with a trombone, which he thought he could play. Like the Scotch pipers he walked as he blew and came closer and closer to us, until we found him right on our trestle, but he passed by and into the distance. We then ascended the hill to our eyrie, where we encouraged the fire to a strong blaze and as we sat about it songs were sung to the limit of our knowledge of the words. Fatigue was not to be denied and four of us lay down close together on some grass, previously gathered. Jarden came first with a bed of salt hay and a nifty gray army blanket, very light; next Sam with a paper stuffed knapsack and light army blanket; Robert with a cool rubber poncho took the next place. I completed the line-up with a poncho, light blanket and newspaper, and for a pillow a grass stuffed knapsack. I slept well until about 1 o'clock when I was disturbed by Robert getting up and going over to the embers of the fire, hardly able to walk for the chill in his system; I spoke to him and went off to sleep again waking only once to find everything wet with a heavy dew. At 5 o'clock I awakened to find all the party gathered about the fire, half frozen; they informed me that they had passed a fearful night, and one by one they had to come to the fire to keep alive. They were all truly delighted to see the dawn and Arctic exploration has lost much of its glamor for them.

The day dawned absolutely clear and the surrounding country

was a glorious picture. Breakfast was prepared and Jarden made a new record by cooking his dry cereal in watered condensed milk. However, fried eggs, bread, butter and coffee satisfied the rest of the party pretty well. At 6.30 we were hard at work on the dumps, collecting far more than we could ever expect to carry away. Dr. J. joined us about 7.30 with a wonderful story of how the hotel, to which we had conducted him, was full of wanderlust maidens and he could not secure accommodations, but was more fortunate at a boarding house where for twenty-five cents he secured the pleasure of sleeping in a large old fashioned bed, and for twenty-five cents more a breakfast of coffee, steak, potatoes, **three** kinds of cheese and **five** of pie! There was more or less envy manifested by the sufferers of the night when the bed and the pie were mentioned. In addition to all this the hotel man had taken the Doctor for an auto ride to the top of some hill.

We felt well repaid for the morning's work about the mine and when noon came we were all ready for our dinner. The poor cook in his excitement tripped over the coffee pot, spilling its contents, and, not being content with this mischief, apparently, stepped into McKinstry's plate and its contents of canned beans; but the camp freely forgave these indiscretions, as every one was in the best of humor. The next few hours saw much excitement, for some of the party eagerly sought specimens to match the more esteemed finds of the others and of course worked energetically, but for the most part without the hoped for results. Most of the earlier finds were discarded, but when the bags were packed there were some back-breaking loads. At 3 o'clock all was ready but the Doctor could not be found and no amount of calling raised him. At last when patience was about exhausted, he calmly appeared in the company of Mr. Madden who cordially invited us to come again when the mine was operating, which was expected to be in the near future. He bid us all good-bye and at 3.30 we started down the hill in the direction of Pottstown. The road was hot and dusty, our loads were staggering and our time somewhat limited but we had a pleasant rest at a fine cool spring about half way, and while waiting for Dr. Jones to come up Robert and Sam secured permission to row on a small pond close by. Pottstown was reached without trouble where the party separated, some returning to Philadelphia by trolley, while the others took the train. The trolleyers reached home about 10 o'clock, and all agreed in pronouncing the trip a great success

THE PHILADELPHIA MINERALOGICAL SOCIETY

THE WAGNER FREE INSTITUTE OF SCIENCE, OCTOBER 12, 1916

A STATED meeting of the Philadelphia Mineralogical Society was held on the above date with President Trudell in the chair. Those present were Allen, Bengé, Egee, Flack, Geist, Gordon, Hagey, Knabe, Leffmann, Lyman, Rothermel, Trudell, Vanartsdalen and Warford.

The following officers were elected for 1916-1917: President, Mr. Harry W. Trudell; Vice-president, Mr. E. A. Groth; Secretary, Mr. Samuel G. Gordon; Treasurer, Mr. Oscar Streland. Mr. Gordon suggested that all committees be merged into a single executive committee; a motion was made and seconded that due notice of an amendment to the By-laws to this effect be made in the minutes.

Mr. Hagey reported a trip to Ward's and Leiper's quarries, with Messrs. Trudell, Knabe, Gordon and Jones. Dr. Leffmann spoke on meteorites in general, and on the Holbrook fall, exhibiting a specimen of the latter. An exhibition of zeolites constituted the program of the evening, many fine specimens from Paterson, Moore, and the vicinity of Philadelphia being shown. Mr. Vanartsdalen described a specimen of stilbite from Moore, N. J., measuring eight inches in length, studded with small, but brilliant pyrite crystals. Mr. Geist told of recent collecting experiences in the street cuts of northern New York City.

SAMUEL G. GORDON, *Secretary*.

THE MINERAL COLLECTORS' ASSOCIATION

A society for those who collect minerals or fossils. Promotes a free and friendly exchange of specimens among its members. Dues: twenty-five cents per year in advance. Official organ, *The Mineral Collectors' Bulletin*. For further information, or in making application for membership, address the secretary,

EDMUND EVERETT HOBBS, SR.,
1501 Weston Ave., Utica, N. Y.

REVIEWS AND ABSTRACTS

TRIDYMITE AND QUARTZ AFTER TRIDYMITE IN ICELAND ROCKS. LEONARD HAWKES, *Geol. Mag.* [6], **3**, (5), 205-209, 1916.

It is shown that tridymite may alter completely into granular quartz, so that no trace of the original tridymite remains, and caution is advised in using the presence of granular quartz as a criterion of the temperature of crystallization of magmas.

E. T. W.

ALUMINIUM HYDROXIDES IN THE ARKANSAS BAUXITE DEPOSITS. D. C. WYSOR, of New York, N. Y., *Econ. Geol.*, **11**, (1), 42-50, 1916.

Gibbsite is universally present, while secondary bauxite and diasporite are sometimes found.

E. T. W.

WOLFRAMITE AND SCHEELITE IN COLORADO. R. S. FITCH and G. F. LOUGHLIN of the U. S. Geological Survey. *Econ. Geol.*, **11**, (1), 30-36, 1916.

The minerals occur in quartz-pyrite veins formed at considerable depths.

E. T. W.

GARNET DEPOSITS ON THE NAVAJO RESERVATION, ARIZONA AND UTAH. H. E. GREGORY, of Yale University. *Econ. Geol.*, **11**, (3), 223-230, 1916.

The garnet is pyrope, and occurs in fragments of gneiss and schist of unknown source.

E. T. W.

CERUSSITE CRYSTALS FROM BROKEN HILL, NEW SOUTH WALES, AND MULDIVA, QUEENSLAND. C. ANDERSON. *J. Proc. Roy. Soc. N. S. Wales*, **49**, 289-331, 1916.

(Abstract by R. L. Sibley, reprinted by permission from *Chemical Abstracts*, **10**, (17), 2184, 1916.)

The cerussite was found on the roof, sides, and floor of vugs in the ore masses associated with iron oxides, anglesite, smithsonite, and galena. Simple crystals are rare, twins being the rule, with *r* (130) or *m* (110) as twin planes. The reticulated or dendritic groups are the commonest. Thirteen groups of crystals were measured and in general the variations from the

true twin position are in the same direction as the crystals investigated by Goldschmidt (*Neues Jahrb. Min. Geol.*, Beil. Bd. **15**, 562-93, 1902) and Hubrecht (*Z. Kryst. Min.* **40**, 147-88, 1905). The crystals group themselves round directions at about 60° apart.

EDITORIAL

IT HAS been decided to bring volume I of the AMERICAN MINERALOGIST to a close with this number, so that volumes will correspond to calendar years. Volume II will begin in January and will contain twelve numbers. Subscribers who have paid for a year in advance will receive the first six numbers of volume II. Anyone desiring to have their subscription expire at the end of a volume hereafter may pay half the annual price at any time.

Volume I has been an experiment, and from many points of view a successful one, judging from the commendatory letters we have received. Altho at first an undue share of the articles has been prepared by the editors, contributions from others have begun to come in, manuscript sufficient to fill the first four numbers of volume II being already at hand, and more is definitely in preparation. We have endeavored to obtain both technical and popular articles, and trust that the contents of the magazine have been varied enough to satisfy every one.

Financially the magazine has not been prosperous. About the time we started, the price of paper took a jump, and for this and similar reasons the cost of publication has considerably exceeded our original estimates. Col. Washington A. Roebbing, with characteristic generosity, has made a large contribution toward the expenses of our first volume; and we have received liberal assistance from our advertizers, and in particular from Dr. George F. Kunz. If the second volume is to be as successful as the first, however, we must double our subscription list. We therefore call upon our friends to help us: If you find the AMERICAN MINERALOGIST of interest, assistance, and value to you, tell your acquaintances and correspondents about it. If every present subscriber could but obtain one or two new ones during the coming year, our success would be assured.

